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October 19, 1957

VOL. 72, NO. 16 PAGES 241-356

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



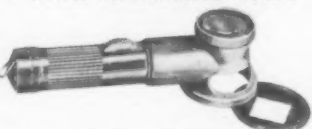
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See Page 244

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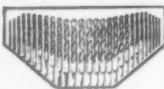
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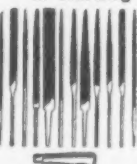
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GEOPHYSICS

Compare "Moon" Programs

The successful launching of the Russian satellite was the result of a "crash" program in satellite research in which speed, not perfection, was the goal.

► THE RUSSIANS crashed through on the satellite just as they have on other programs that bring them into intense competition with Americans. There is a different method of getting things done in the Russian and American worlds.

In the case of the satellite, the Russians seem to have used their Intercontinental Ballistic Missile to fling it high enough and with enough velocity to get it into an orbit.

A special rocket to launch the U. S. satellites is being built, paralleling the development of war rockets. Moreover, there are a multiplicity of war rockets in the U. S. program, rather than a concentration upon two or three. Our rocket scientists have been perfecting a variety of mechanisms to be placed in their satellites, instead of concentrating upon scoring a "first" in getting an artificial moon traveling around the earth.

In the long run, the U. S. program will undoubtedly give more solid information about the upper atmosphere, solar ultraviolet radiation, cosmic rays and weather patterns on earth than the Soviet observations. But the U. S. perfectionist attitude has lost a first in satellites for our side.

Much the same thing happened in atomic power. The Russians rushed a power-pro-

ducing plant without too much regard for some of the safety factors. We went more slowly with more testing, care and safety. For one thing, we did not need the power as such, and we had scored a resounding first in the atomic and hydrogen bombs. Over the course of years, we shall do quite as well as the Russians and probably a great deal better.

Earth's Companion

► HERE IS a resume on just what facts are known about the Soviet's satellite, sputnik:

Size and weight: It is a sphere 22.8 inches in diameter, weighing 184 pounds. About 30 or 40 pounds of this weight, it is estimated, are accounted for by the batteries used for power to send signals.

Launching Site: Western scientists have not been able to calculate the launching site in Soviet Russia and Russian announcements have not given this information. The estimated time of the launching was Friday, Oct. 4, at 5:05 p.m. EDT.

Orbit: Sputnik's path around the earth is elliptical and ranges from 300 to 400 miles above the earth. However, its orbit is changing. At launching, the Russians an-

nounced, its orbit was inclined at an angle of 65 degrees to the equatorial plane, thus carrying sputnik over the polar regions.

Speed: Sputnik is circling the earth at 18,000 miles per hour. It makes 15 passes within 24 hours, or one every 96 minutes.

Signal: Two radio transmitters continuously emit signals of 20,005 and 40,002 megacycles frequency which are sent in the form of telegraph messages lasting about three-tenths of a second. These radio impulses or "beeps" are in the key of A flat, reports one scientist. (See p. 245.)

Visibility: Sputnik can best be seen with the naked eye at sunrise and sunset. Reports of its brightness range from something comparable to the North Star's brightness to as bright as the dimmest star in the Big Dipper's handle.

Cost: Western scientists estimate that over the last five or six years the Russians have spent \$14,000,000,000 on their earth satellite program.

What does "sputnik" mean? One translation might be traveling companion. "Putj," in Russian, means "the way" and "putnik" is someone who goes on a journey. The earth is a putnik. The Russian satellite is accompanying it and is a sputnik.

Science News Letter, October 19, 1957

AERONAUTICS

U. S. Studying Ion Power For Future Satellites

► SATELLITES of the future will be controlled and accelerated in their orbits and sent into outer space by streams of ions when such a propulsion device is developed by National Advisory Committee for Aeronautics. Research on such a device was reported in Cleveland, Ohio, as being under way.

Use of ion streams is still very much in the future but a new apparatus demonstrates how portions of atoms, bits of matter carrying electrical charges, can be propelled to high velocity by use of electric and magnetic fields.

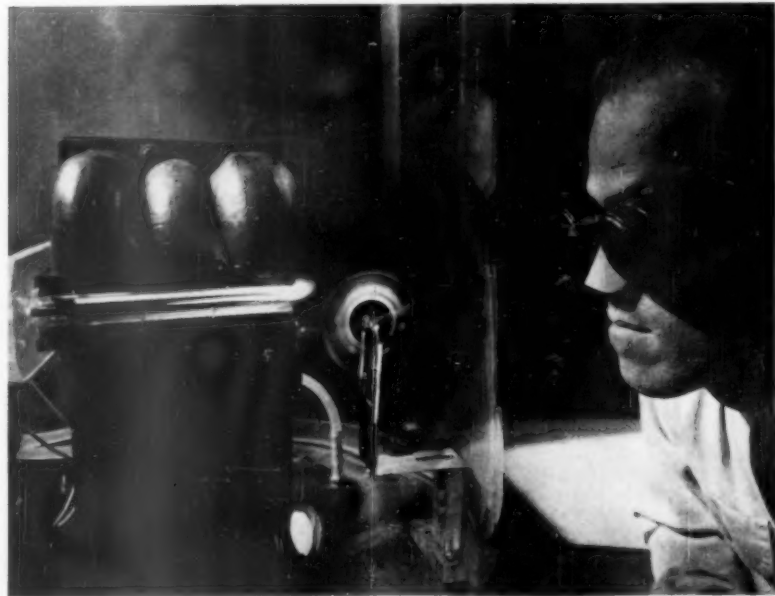
Due to the fact that there is no air in outer space that will allow air-breathing engines to operate, a propulsion device capable of operating in a vacuum must be perfected.

The ion streams, which do have a considerable amount of thrust, are therefore an attractive and possible means for powering an outer space device.

The NACA engineers definitely visualize using such a method to apply energy to future satellites and to change them in their orbits. This would be a way to take a satellite out of its orbit and propel it on its way into outer space such as would be necessary on attempts at travel beyond the earth other than simply moon-like swings around the earth.

An electric arc, which gives a high current discharge such as is visualized for future use, also approaches a high speed stream of particles at temperatures of 10,000 to 20,000 degrees Fahrenheit. This allows the scientists to study temperature conditions under which a satellite must re-enter the earth's atmosphere.

Science News Letter, October 19, 1957



ION JET—A miniature laboratory ion-propulsion model, operating at near vacuum conditions, produces thrust which is detected by the small wheel behind the jet. An ion jet is produced when charged particles are formed in an electric discharge between two electrodes and are accelerated by a magnetic field.

GEOPHYSICS

Both Satellites Needed

See Front Cover

► WHEN THE U. S. earth satellite is launched, it will complement rather than rival its Russian counterpart.

Because the two satellites will be following different orbits, each will be in a position to provide better data on specific studies than the other.

The Red satellite now circling the planet earth is traveling the "Polar" orbit, a highly inclined orbit. The U. S. satellite, scheduled for launching this spring, will follow a much shallower orbit, almost "Equatorial."

This means the Russian satellite is in a better position for cosmic ray studies because it crosses those latitudes where the change in cosmic ray intensity is greater. The Polar route also permits better research on the auroras or "northern lights," because it cuts through the auroral regions.

The U. S. satellite, on the other hand, will be in a far better position to pick up information for geodetic studies, such as the earth's bulge. It also will provide more precise information of the earth's magnetic field during its run around the earth.

Both orbits provide equal opportunity for solar studies.

The choice of orbits by both the Soviet Union and the United States was made more because of geographical reasons.

As long as the Russians wanted to fire their satellite from within Russia, they had to choose a highly inclined orbit. The orbit is always at least the latitude of the launching site.

Planners for Operation Vanguard, the U. S. satellite program, had to be content with the Equatorial orbit when they decided on using Florida as their launching site. This decision was made primarily because Patrick Air Force Base at Cape Canaveral is fairly well equipped to do the job.

In the very early stages of planning the

orbit for the U. S. satellite there was some talk that an Equatorial orbit would be politically more feasible, although less scientifically feasible. It was suggested that a satellite traveling the Equatorial route would be flying over territory where permission could be obtained with little or no difficulty. This consideration, however, did not figure heavily in the final decision.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows the sub-satellite that the U. S. National Advisory Committee for Aeronautics (NACA) is contributing to our satellite program.

The sub-satellite, a 30-inch "balloon" made of a polyester plastic film bonded to aluminum foil, will be used to measure the resistance or drag encountered by the satellite in its travels around the earth. Together with its inflation tank it will weigh 0.69 pound. W. J. O'Sullivan holds the deflated sub-satellite which will be ejected and inflated automatically when it reaches peak altitude. The gas will then be released since it serves only to "iron out" wrinkles in the balloon.

One additional advantage of a Polar route is that it cuts over more land area than the Equatorial orbit, permitting more land-based tracking stations for scientists.

Science News Letter, October 19, 1957

MANPOWER

ManpowerExpertAttacks Reports Shortage Ended

► THE GOVERNMENT'S top spokesman on scientific manpower has charged that there is still a serious shortage of scientists and engineers despite "some newspaper reports" to the contrary.

"The scarcity of scientists, engineers and skilled technicians is a very real fact in American life. It will continue to be a national problem for at least another eight

to ten years," Dr. Howard L. Bevis, chairman of the President's Committee on Scientists and Engineers, warned.

Dr. Bevis told the Upper New York-Ontario section of the American Society for Engineering Education that "The nation's scientific and technological manpower is still a precious resource, despite some newspaper reports that we have caught up with the shortage and that there is, in fact, a surplus of engineers."

He claimed the reports have grown out of cutbacks in some defense contracts, chiefly affecting the aviation and electronic industries.

These are "surface ripples in narrow, specialized areas of the economy," he declared.

Science News Letter, October 19, 1957

SCIENCE NEWS LETTER

VOL. 72 OCTOBER 19, 1957 NO. 16

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington 6, D. C., NO. 7-2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents; more than six months old, 25 cents. No charge for foreign postage.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 3440, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283) authorized February 28, 1925. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.



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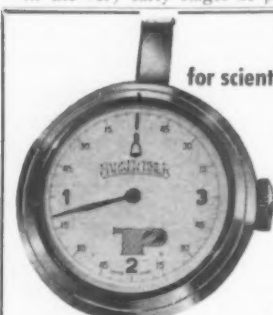
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GEOPHYSICS

Sputnik Has Long History

Although the launching of the Russian's satellite was probably the result of a "crash" program, it was preceded by more than a half century of research in rocketry.

► THE RUSSIANS credit their own rocket scientists historically for the research that culminated in the launching of the earth satellite sputnik.

Chief recipient of Russian honors is, in the Russians' own words, "the modest Kaluga schoolmaster," Konstantin Tsiolkovsky. This early Russian astronaut was making space travel calculations at the turn of the 20th century. Working at about the same time on similar plans, but independently, were Prof. Robert Goddard of the United States and Hermann Oberth of Germany.

In 1903 Tsiolkovsky published what is considered a classic work in the field of interplanetary travel called *Exploration of the Spaces of the Universe by Jet-Propelled Instruments*. In his book, Tsiolkovsky showed the advantages of the rocket for use in a spaceship and designed the basic features for such a craft.

Tsiolkovsky is generally credited by rocket experts even in this country with proposing a liquid-propellant rocket engine and being the first both to present a mathematical flight theory and to propose oxygen and hydrogen as rocket propellants.

Following Tsiolkovsky, the Russians credit a pair of scientists, F. A. Tsander and Yu. V. Kondratyuk with contributing heavily to the early rocketeering by proposing the use of solid metal fuel for rocket engines.

Tsander, they say, during the 1920's and 1930's published several works on the use of interplanetary rockets, particularly rockets which consumed part of themselves for fuel. He published his chief findings in 1932 in a book entitled *The Problem of Flight by Means of Jet-Propelled Devices*.

Kondratyuk, also concerned with composite rockets, worked out a theory of flight, take-off factors and suggested the use of a landing glider to act as a brake on an interplanetary rocket on its descent back to earth.

Each of the three early Russian rocket experts were concerned with the establishment of an earth satellite that could be manned and operated as a scientific station. All drew up plans for sending parts of such a station into outer space in rockets so that the rockets could be joined together to form the station.

It is interesting to note that the Germans during World War II overran Tsiolkovsky's old laboratory located in the suburbs of Moscow.

Although the Russian rocket scientists and equipment had already been evacuated to Sverdlovsk in the Ural Mountains, the Germans found evidence to indicate the Russians were carrying on an active rocket research and development program even before World War II.

Science News Letter, October 19, 1957



SATELLITE'S ORBIT—This map of the United States shows the predicted orbits of the Russian satellite sputnik for the dates Oct. 9 and Oct. 10. Between each pass, represented by the heavy black lines, the orbit shifts approximately 24 degrees west at the equator. Radio-tracking equipment and information supplied by the Mini-track stations provided the data used by the U. S. Naval Research Laboratory in compiling the map.

● RADIO

Saturday, Oct. 26, 1957, 1:45-2:00 p.m., EDT
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Dr. James A. Reyniers, research professor of bacteriology, University of Notre Dame, Ind., will discuss "Germ-Free Life." This program had been scheduled originally for October 19.

GEOPHYSICS

Here's How to Hear The Russian Satellite

► SHORT WAVE radio listeners who wish to hear the radio signals coming from the Russian satellite can quickly find the correct setting on their dial by locating radio station WWV.

This station is operated 24 hours a day by the National Bureau of Standards in Washington, and transmits a continuous series of clicks spaced one second apart. Every three out of five minutes a low pitched tone is added over the clicks.

WWV transmits on several frequencies at the same time, but the important one is 20 megacycles. The Russian satellite is transmitting at both 20.005 megacycles and 40.002 megacycles.

After WWV is located the radio dial should be turned just a fraction of an inch toward the higher frequency side, that is, toward 21 megacycles.

The satellite's signal is easy to recognize since it is a continuous series of "beeps," three-tenths of a second long, each followed by a pause of the same duration.

The signal will be strongest when the satellite passes over your section of the country and will then rapidly fade out as it spins on toward the poles.

Station WWV makes a handy reference point because many times the markings on the radio dials are not exact. WWV is always exactly on 20 megacycles.

Science News Letter, October 19, 1957

GEOPHYSICS

Satellites' Lifetimes Halved by New Data

► SATELLITES, including the Russian one now circling the earth, may live a shorter time than estimated because of electrostatic drag that seems to have been ignored in earlier calculations.

Two scientists from the Naval Research Laboratory, R. Jastrow and Cabell A. Pearce, have estimated the effect of the picking up of negative charges by the sphere as it moves through the ionosphere. They figure that the drag on the satellite due to this cause will about equal that due to the collisions with neutral air particles.

The catch is that estimates of satellite lifetimes have ranged from several weeks to about nine years and a halving of these estimates does not sharpen materially predictions as to how long the Russian satellite will remain in the sky.

The new estimates are reported in *Astrophysics* (Oct.), publication of the American Rocket Society.

Science News Letter, October 19, 1957

GEOPHYSICS

Find Electro-Jet Current

► THE EXACT location of the electro-jet current, a globe-circling system of concentrated electricity high in the atmosphere, has been found from the first records made of geomagnetism during the International Geophysical Year.

At one point in the electro-jet's world-girdling path, it passes directly above Koror Island, which is in the Palaus about seven

degrees north of the geographic equator. The location was reported by Rear Adm. H. Arnold Karo, director of the U. S. Coast and Geodetic Survey.

The electro-jet is thought to be part of a planet-wide system of electric currents, active primarily during the daylight hours, responsible for changes in the earth's magnetic field in the equatorial regions. Obser-

vations of it near the equator are very important because changes there are not always accompanied by disturbances in the polar regions, but the reverse is not always true.

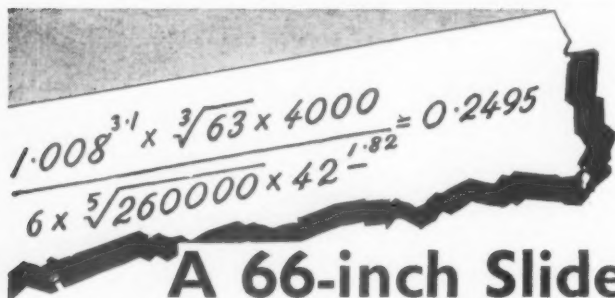
Koror Island was chosen for an IGY observing point because it is near the magnetic equator, and is the only magnetic observatory in the Pacific Ocean now in operation. Since the electro-jet is thought to straddle the magnetic equator, the Koror records can be compared with those from stations outside the area influenced by the high altitude current.

When further information is received at the Survey's IGY record center in Washington, D. C., scientists believe the electro-jet's nature and cause will be found. The Koror records already have indicated unusual conditions of the magnetic field not present at the Guam observatory just a few degrees northeast of Koror.

The magnetic equator is the line connecting all points where the direction of the earth's magnetic field is completely horizontal. It wanders to the north of Koror at one time of day, then moves an equal distance south at another time of day.

The Koror records were received at the recently opened record center for the Western Hemisphere. IGY information on geomagnetism, gravity and seismology are kept there, including some from behind the Iron Curtain in Romania.

Science News Letter, October 19, 1957



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Model L solves multiplication, division, percentage calculations, etc.; it also gives logarithms as well.

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PLANT PHYSIOLOGY

Gibberellic Acid Reverses Virus-Caused Stunting

► GIBBERELLIC acid, the "wonder" growth-promoter, can cause virus-stunted plants to grow again, a scientist reports in *Science* (Oct. 4). Previous research has showed the hormone-like substance can overcome both genetic and physiologic stunting.

Dr. Karl Maramorosch, plant pathologist at the Rockefeller Institute for Medical Research, New York, tested the chemical on three virus-susceptible plants: hybrid sweet corn, China asters and crimson clover. He used leafhopper-borne viruses known to cause severe stunting.

Six weeks after inoculation one group of severely stunted plants was sprayed with a freshly prepared water solution of gibberellic acid at 100 parts per million. The control group of similarly stunted plants was sprayed with distilled water and both groups kept on the same greenhouse bench. Two other treatments were given the plants at weekly intervals. In all three plants—corn, asters and clover—gibberellic acid "influenced significantly the growth of virus-stunted plants." Corn resumed growth within 48 hours of its first treatment, reports the scientist, while growth was visible in the other plants after five days.

Even though the gibberellic acid overcame the stunting effects of the virus, Dr. Maramorosch points out that the diseased plants retained other signs of infection. The tiny insect leafhoppers recovered the viruses from both treated and untreated plants.

Science News Letter, October 19, 1957

ASTRONAUTICS

Flight to Moon in 3 Years

With a man-made satellite circling the earth space travel to the moon seems much nearer. The year 1960, says a Russian scientist, may see man flying to the moon.

► A FLIGHT to the moon is possible within the next three years. A flight to Mars—within the next 13 years.

This is the opinion of Prof. Kirill Stanyukovich of the Baumann Institute of Technology in Moscow and one of Russia's leading rocket experts. It was Dr. Stanyukovich who was picked to broadcast the details of the Soviet earth satellite to the Russian people on Saturday, Oct. 5.

But whether the Russians will attempt an interplanetary flight seems unlikely. They might, however, together with the United States. Thus, the current rivalry and technological race between the U. S. and the U. S. S. R. could end in man's next step at conquering outer space.

The reason Russia might balk at going it alone to the moon and Mars, Dr. Stanyukovich says, is financial.

"The interplanetary rocket will require a mass of complex automatic equipment. The cost of its construction will run to tens of billions of dollars, more than any one country can afford. It will have to be an international undertaking," he states.

The "rendezvous with Mars," as Dr. Stanyukovich calls it, as well as a flight to the moon, has long been a dream of Russian rocket experts.

Although there are still problems to be worked out, Dr. Stanyukovich is optimistic that a rocket can be sent to the moon. He says that "calculations suggest that interplanetary craft will be in the form of atomic rockets."

While he admits that no atomic reactor capable of operating at the high temperatures needed has been devised as yet, Dr. Stanyukovich believes "reactor techniques are developing very fast, and it can safely be predicted that the necessary type will be produced within the coming few years, in a number of countries."

Manned flights, he says, are still a long way into the future.

Even unmanned spaceship flights will have to wait until such questions as magnetic fields in cosmic space and the impact of meteorites have been answered.

This is where the earth satellite now whirling around the earth will figure importantly in outer space travel plans for the Russians.

"These are all difficulties that must be overcome, step by step," Prof. Stanyukovich says, "by dispatching first an earth satellite, then a rocket to the moon, and then a rocket to Mars."

Science News Letter, October 19, 1957



ULTRAPURE NIOBIUM—Rising slowly inside a copper coil carrying high-frequency alternating current, a bar of niobium is made ultrapure. The process, called "cage zone melting," produces a molten zone of metal which moves along the length of the niobium bar while trapped in a cage formed by the four corners of the bar which do not melt. Engineering specialist J. W. Salata observes the near-4,400-degree Fahrenheit temperature of the molten metal.

METALLURGY

Study Wonder Metal In Pure Form

► A LITTLE-KNOWN metal, niobium, believed to be a major key in the development of future engines and nuclear reactors, has been produced in its purest form by Westinghouse scientists, Pittsburgh, Pa.

Perfection of a technique to provide enough pure niobium for detailed study of its properties is expected to bring the metal a step closer to its use in power plants of tomorrow.

New alloys based on niobium are foreseen as holding up well at temperatures above 1,800 degrees Fahrenheit, more than 100 degrees beyond the maximum operating temperatures of the best existing engine and reactor structural materials.

The scientists purified the metal by repeated meltings in a nearly perfect vacuum. The high temperature and low pressure distills impurities out of the metal.

The work on the "wonder metal" is being done in cooperation with the U. S. Air Force's Wright Air Development Center.

Recently, says R. T. Begley, metallurgist at Westinghouse, large reserves of niobium ores have been discovered which could take the metal, formerly called columbium, out of the "rare metal" classification.

Science News Letter, October 19, 1957

PHYSIOLOGY

Need Strong Space Men

Man will have to overcome his physical frailty in flight and conquer the medical problems of "inner" space before he can undertake journeys into the outer space.

► U. S. NAVY pilots are engaged in a peacetime combat that is claiming more lives than those lost by non-flying naval officers during World War II, scientists at the International Conference of Ultrasonics in Medicine meeting in Los Angeles learned.

"This combat is not man against man, or plane against plane, but man battling the forces of nature often under very unfavorable environmental conditions," Captain Ashton Graybiel, director of research at the Navy's School of Aviation Medicine, Pensacola, Fla., said.

Dr. Graybiel explained that a pilot in a high-performance aircraft "who is knocking against the barriers which still confine him to earth" is subjected to three problems: spontaneous development of disease or disorder, unfavorable environmental influences, and mechanical or equipment failures.

Illustrating the sudden development of a disorder, even after a pilot has received an

O.K. from the flight surgeon, Dr. Graybiel pointed to acute attacks of coronary heart disease in young persons.

"There have been a number of instances of acute coronary insufficiency developing in pilots during flight. There may have been more but we are unsure, many accidents go unexplained," he reported.

Add to this the extraordinary stresses, unforeseen complications, bad weather and mechanical failures and the pilot ends up a given flight much the worse for both mental and physical wear.

Travel into outer space, Dr. Graybiel said, exposes this same pilot to new and possibly more devastating hazards; prime among these is cosmic rays. Space travel for man therefore, although exciting to the imagination and a possible means for bringing the nations of the world together, will have to hurdle the "frailty of man in flight" before becoming a reality.

Science News Letter, October 19, 1957

PHYSIOLOGY

Humans Can Breathe Minus Most Muscles

► DESPITE ALMOST total loss of breathing muscles, the human body can still maintain effective respiration, reported Dr. Allan Hemingway of the University of California at Los Angeles Medical School.

Dr. Hemingway described results of a U. S. Public Health Service-supported study with paraplegics to a recent American Physiological Society meeting at the State University of Iowa.

The UCLA physiologist and his associate, Dr. Ernest Bors, examined 63 paraplegics from the Long Beach Veterans Hospital. Most of these patients had injuries which had completely severed their spinal cords and paralyzed muscles of respiration. These include muscles between ribs, abdominal muscles, and the diaphragm.

Patients who had injuries high in the spinal cord, in the neck region, had lost the use of all major breathing muscles except the diaphragm. Despite this handicap, they possessed surprisingly effective respiration, as measured by pulmonary function tests.

Their vital capacity was approximately 70% of normal, while maximum breathing capacity was about 55% of normal. They could perform mild exercise without difficulty.

Paraplegics with damage to the middle or lower part of the spinal cord had more breathing muscles available and retained better pulmonary function.

The diaphragm alone is adequate for respiration in paraplegics, Dr. Hemingway concluded. This muscle, however, does not provide any force for coughing, which is necessary to clear respiratory passages.

Science News Letter, October 19, 1957

CHEMISTRY

Dry Batteries Operate At Temperature Extremes

► TWO GROUPS of completely dry batteries that operate at vast temperature extremes were described to the Electrochemical Society meeting in Buffalo, N. Y.

One group of batteries designed for use in arctic regions operates efficiently at temperatures lower than 58 degrees below zero Fahrenheit. Another group, designed for use in electronic equipment, increases efficiency as the temperature is increased up to about 275 degrees.

Neither group of batteries contains any liquid or involves moving parts.

The low temperature batteries contain compounds that can react with ammonia to form ammonium compounds with the release of electrical energy. The dry batteries are activated by the addition of ammonia gas, J. M. Freund of Eastman Kodak Company, Rochester, N. Y., said. He and H. S. Gleason, of Eastman Kodak, developed the batteries with the cooperation of Dr. L. J. Minnick and W. F. Meyers of G. & W. H. Corson, Inc., Plymouth Meeting, Pa., who discovered the method while developing a process for extracting metals from ores.

Mr. Freund said the batteries can be tested by adding ammonia gas, and then deactivated for storage simply by removing the gas with a vacuum pump.

The scientists have used their batteries to operate lamps and small equipment at 58 degrees below zero Fahrenheit. Storage batteries were operated at 65 degrees below zero at the University of Michigan in 1951 as part of an Army Ordnance project. However, these were conventional liquid batteries with structural modifications.

The high temperature batteries reported by Dr. J. L. Weininger, General Electric Company research laboratories, Schenectady, N. Y., are based on silver compounds. The completely dry batteries are smaller and lighter than conventional liquid batteries of the same efficiency.

A major ingredient of the batteries is silver iodide. The compound increases its activity in the cell as the temperature of the battery increases. For purposes of operating photomultiplier tubes, scintillation counters and other electronic devices, the battery becomes more efficient with increasing temperature, Dr. Weininger said, and added that the new batteries could lead the way to the development of thermocells. Such a device could be a power source that is normally non-producing, but is activated by heating it.

Science News Letter, October 19, 1957

PUBLIC HEALTH

Paralytic Polio Cases Down 80% in Two Years

► A DROP of 80% in paralytic polio cases over the past two years has been reported by Marion B. Folsom, secretary of Health, Education and Welfare.

With the Salk polio vaccine now available, this type of polio can be given a "knockout" blow within the next year, if people will use it.

But millions of Americans under 40 still have not received full vaccine protection and are needlessly risking disability or even death, he warned.

Supplies are again beginning to pile up in warehouses as they did last fall before production was cut back. When spring came, however, the demand had picked up so much that vaccine was again in short supply.

"We are most anxious to avoid this sort of boom-or-bust cycle, which seriously impedes an effective vaccination program," Mr. Folsom said.

Only 63 cases of paralytic polio have been reported among the 28,000,000 persons who have received three shots of vaccine, and not all of these have been confirmed yet, Dr. Leroy E. Burney, surgeon general of the U. S. Public Health Service, said.

About 12,000,000 doses of the vaccine are being produced each month and over 215,000,000 have been released since April, 1955, when the vaccine was first manufactured.

The back stock of vaccine has already begun to pile up and now amounts to about 23,000,000 doses waiting to be used.

Science News Letter, October 19, 1957

IN SCIENCE

MEDICINE

Stop Fatigue With Exercise, Not Rest

► IF YOU are "worn-out" from fatigue, physical activity may help you more than rest, Dr. Theodore G. Klumpp, president of Winthrop Laboratories, Inc., New York, reports in the *Journal of the American Medical Association* (Oct. 5).

Rest is no cure-all for fatigue, even among aging persons, since the condition often comes from "atrophy of disuse."

For a long time, doctors used to treat fatigue by having the patient cut out something, no matter how little he was doing. If he did nothing more than sit in a rocking chair all day long, he was no doubt told to stop rocking and go lie down, Dr. Klumpp says.

Now physicians know better. Following the surgeon's practice of getting patients up soon after surgery, they now prescribe physical activity.

Young people can keep in relatively good shape through sports and play, but as they grow older they tend to give up these things and become quickly fatigued.

Labor-saving devices that now include electric golfmobiles cause them to suffer rapidly from atrophy of disuse.

Exercise is the answer but it should be fun and not drudgery. After an emotionally exhausting day behind a desk, a little exercise can work wonders against fatigue.

Science News Letter, October 19, 1957

AERONAUTICS

Long-Range Radars and Amplifiers Bought by CAA

► FOUR NEW long-range radars, and amplifying equipment to increase by 68% the range of ten sets already on order, are being bought by the Civil Aeronautics Administration.

CAA Administrator James T. Pyle said the purchase was "another step in CAA's intensive preparations for the jet age."

Raytheon Manufacturing Company of Waltham, Mass., will furnish the units and equipment at a total cost of \$4,135,000. The long-range radar will be identical to the 23 sets ordered a year ago.

The amplifying equipment, known as Amplitron, increases the power from the radar transmitter by eight times. Under good conditions, a small target otherwise not visible on the radar screen beyond 50,000 feet and 100 miles away could be spotted more than 80,000 feet and 170 miles away on the same equipment with the Amplitron.

The first Amplitron will be installed on the long-range radar at the Washington air route traffic control center.

Science News Letter, October 19, 1957

CE FIELDS

GEOLOGY

Examine Snail Shells For Past Climate Changes

► **SNAIL SHELLS** are being examined as a clue to patterns of climate change on the earth.

Dr. Dwight W. Taylor of the U. S. Geological Survey, one of the few snail shell specialists in the world, has used the shells to show that the present age is one of the hottest and driest in earth's history. Ultimately, the snails may be important keys to establishing a pattern that would show when the climate might be expected to change again.

In southwestern Kansas, where Dr. Taylor has done most of his work with snails, some shells are like those living today, but others found as fossils are now extinct in that area. The extinct types are living several hundred miles away in cooler climates. Since the snails once lived in Kansas, Dr. Taylor believes the state was not always so hot and dry.

Snails are already helping studies of ground water potential. Their shells indicate the distribution and thickness of underground deposits that might bear water. Oil companies use the shells as an index to oil reserves in some areas.

Science News Letter, October 19, 1957

ORNITHOLOGY

Sun and Stars Thought To Aid Birds in Migration

► **HOW DO** birds navigate in their north and south migrations? That is a question man has puzzled over for many thousands of years. It is a question for which scientists are at last beginning to find answers.

Frank C. Bellrose, game specialist of the Illinois Natural History Survey, recently joined scientists of England, Germany and Switzerland in contributing to a solution of the mystery of bird navigation.

Working with wild mallards, Mr. Bellrose developed the hypothesis that waterfowl use the sun and stars as aids in charting their courses.

Mr. Bellrose and Robert Crompton, field assistant, trapped mallards along the Illinois River, removed them various distances from the river, released them under various weather conditions, and charted their initial lines of flight.

When weather was clear and sun or stars were visible, the mallards almost invariably set off in a northward direction. When sun or stars were obscured by clouds, the birds acted confused, and set off in any of various directions.

The scientists were able to follow the night flights by means of a tiny flashlight attached to a leg of each bird.

Time of day or of year, as well as wind

direction and velocity, made no difference in the orientation patterns. Only when ducks were held in captivity for a month or more did they lose their ability to orient northward on clear days or nights.

Mr. Bellrose believes the initial northward orientation on the sun or stars is only part of the larger navigation picture. Upon release, the birds fly northward until they are sure of their bearings. In spring they continue their flight northward, and in fall they reverse their course and fly southward.

At the present time, he is working with blue-winged teals to see if other species have flight behavior patterns similar to those of the mallard.

Science News Letter, October 19, 1957

PHYSIOLOGY

How Seals Dive Helps Jet Scientists

► **WILD SEALS** are being used by a team of scientists from the London Hospital Medical College to help pilots to withstand intense pressures in supersonic planes.

The scientists go to the lonely shores of the Wash, on the east coast of England where seals abound. They are finding how the seals can dive to a depth of 300 feet without damaging their lungs.

The scientists have a difficult time themselves while catching the seals. Several of them have fallen overboard from their small boat. They have been bitten many times.

"The seals are really fierce, and catching them is quite a hazard," one scientist said. "But we must get them. They have amazing lungs and if we can find out more about them and their breathing we can help pilots and other people who are subjected to intense pressures, such as men escaping from submarines."

Some seals are caught and kept in tanks in the college grounds. Others are thrown back in the water after on-the-spot heart tests.

Science News Letter, October 19, 1957

GENERAL SCIENCE

U. S. Engineering Schools Research in the Millions

► **THE NATION'S** engineering schools spent more than one-fourth of all the dollars doled out for research by American colleges and universities during the 1953-54 period, the National Science Foundation reported.

Approximately \$75,000,000 was expended by the engineering schools for research and development projects. Of this amount, \$55,000,000 represented support by the Federal Government, mostly contracts with the Department of Defense. Altogether, in 1953-54, American schools spent \$300,000,000 on research and development.

Eighteen of the 109 schools surveyed reported each had separately budgeted research expenditures of over \$1,000,000. The study also showed the bulk of the money went for projects in the electrical and aeronautical departments and that the preponderance of research was applied rather than basic.

Science News Letter, October 19, 1957

PHARMACOLOGY

Report Three New Antibiotic Drugs

► **THREE NEW** antibiotics, Telomycin, pimaricin and sulfocidin, were reported by drug researchers at the Fifth Annual Symposium on Antibiotics meeting in Washington, D. C.

Telomycin has been isolated from an unidentified species of Actinomycete fungus and is active against the type of bacteria that causes pneumonia, tuberculosis, and other diseases. Its discovery was reported by a research team from Bristol Laboratories, Inc., Syracuse, N. Y.

Pimaricin works against a large number of fungus growths and yeast. The drug has no effect on bacteria, scientists from the Royal Dutch Yeast and Fermentation Industries, Delft, Holland, reported to the symposium.

The third new antibiotic, sulfocidin, was found in the broth of an undescribed strain of Streptomyces fungus.

It has been found to be active against both bacteria and fungi and only small amounts of it are needed against many types of bacteria. It is also active against some tumors in mice. It was reported by Drs. Morris Zief, Robert Woodside and George E. Ham of the J. T. Baker Chemical Co., Phillipsburg, N. J.

Reporting on Telomycin were Drs. M. Misick, O. B. Fardig, A. Gourevitch, D. L. Johnson, I. R. Hooper and J. Lein. The Dutch researchers reporting on pimaricin were Drs. A. P. Struyk, I. Hoette, G. Drost, J. M. Waisvisz, Th. van Eek and J. C. Doogerheide.

Science News Letter, October 19, 1957

NATURAL RESOURCES

Water Will Be Plentiful But Increasingly Costly

► **MOST OF THE NATION** will have enough water to meet its needs for a long time to come, but the water will cost more and more, Dr. T. B. Nolan, director of the U. S. Geological Survey, said at the Fourth National Watershed Congress meeting in Atlanta, Ga.

"We can say emphatically," Dr. Nolan told conservationists and water experts, "that we will have water to meet our needs except for irrigation in the arid or sub-humid regions in the immediate and even the reasonably distant future. We can say with equal emphasis that there is not the slightest possibility of obtaining new supplies at the same cost as we get those used today."

"This is not a matter of inflation—it is the law of diminishing returns. In resource development, the best and cheapest sites are utilized first, so inevitably increased use is accompanied by increased cost."

"In short," he told the meeting, "the problem is water and people. This being so, water-resource development can proceed in no other fashion than which takes place under the brilliant light of full, if sometimes bitter, public discussion."

Science News Letter, October 19, 1957

PHYSICS

Mr. Atoms for Peace

Niels Bohr of Denmark is the first recipient of the \$75,000 Atoms for Peace Award. A unanimous choice, Dr. Bohr is considered the world's greatest living theoretical physicist.

By HOWARD SIMONS

➤ ON TUESDAY, Oct. 24, 1957, Niels Henrik David Bohr of Denmark will receive a \$75,000 Atoms for Peace Award in Washington, D. C.

He will be the first man in the world to be so honored.

The 72-year-old atomic scientist and Nobel Prize-winner was the unanimous choice for the first of ten such Awards to be given to "those persons anywhere in the world who have made the greatest contributions to the peaceful uses of atomic energy."

When he was only 28 years old Dr. Bohr opened a new era in atomic science. Today, this giant of the tiny atom is considered to be the world's greatest living theoretical scientist.

The year was 1913. Dr. Bohr, who had earned the doctorate in physics only two years before at the University of Copenhagen, was working with Ernest Rutherford at the University of Manchester in England. Prof. Rutherford (later to become Lord Rutherford) had just established that the atom had a dense nucleus with positive charge which occupies only a small portion of the atom, and that, surrounding this dense nucleus, there are electrons of negative charge in sufficient number to balance its positive charge. But this picture of the atom was not complete.

Bohr's Model of the Atom

In a series of papers that more than startled leading scientists, young Niels Bohr filled in the gaps and did more. He portrayed the atom as a sort of solar system in which the sun is represented by a nucleus of positive electricity and the planets by particles of negative electricity revolving around it at high speed. This is still the picture that most older persons see when they think of an atom.

But Bohr's theories did much more than just sketch a portrait of the atom. He also offered an explanation for radiation phenomena by postulating that the electrons moving around the nucleus are confined to restricted orbits.

This concept of the atom, together with Rutherford's contributions, were the beginnings of modern atomic physics and have led man to his present world of atomic bombs and atomic energy.

These theories also laid the foundations for the science of spectroscopy—the taking of electronic fingerprints.

Together with his 1913 theories and later papers, Dr. Bohr clarified the basic principles of quantum mechanics.

In 1922, at the age of 37, Niels Bohr was

awarded the Nobel Prize for physics. At that time, he was the youngest scientist ever to receive a Nobel Prize.

While this great Danish scientist was working out theoretical principles to guide atomic physicists in their work, he was also becoming known as a great humanitarian. In 1920 the Institute for Theoretical Physics was established in Copenhagen and Dr. Bohr was made its director. A unique academy that has hosted many of the world's finest minds, the Institute has never had another director.

Physicists' School

In describing the Institute, which is synonymous with Dr. Bohr in the world of science, Dr. James R. Killian Jr., chairman of the board of directors of the Atoms for Peace Awards, had this to say:

"Its roster of distinguished fellows includes leading physicists from almost every country in the world, men who were attracted primarily by the opportunity to work with Prof. Bohr. His humanity, his goodness and wisdom—in addition to his outstanding scientific contributions—have inspired the many scholars who have been

his students and colleagues to become a nucleus of international understanding and good will."

The Institute is still functioning today, as is Dr. Bohr. In the years preceding the Second World War, the Institute became a haven for the many scientists who were forced to flee their own countries. But in 1943, even Dr. Bohr was forced to flee before the jackboots of Nazism and after escaping to Sweden hidden in a fishing boat, he was flown in the bomb-bay of a British airplane to England.

In December of 1943, Dr. Bohr landed in the United States, where he took an active part in our nation's wartime atomic energy development program.

At war's end, Dr. Bohr returned to his birthplace, Copenhagen, and to his rigorous schedule at the Institute, where once again Dr. Bohr and the Institute serve the world's atomic physicists.

The early work that earned Dr. Bohr his Nobel prize is by no means his only or even his most important contributions to man's modern intelligence of the atom. In 1936, for example, he proposed his theory of nuclear reaction which successfully interpreted the experiments of the late Dr. Enrico Fermi and others on the interaction of neutrons with nuclei.

In 1939, while on a visit to the United States, Dr. Bohr, together with Dr. J. A. Wheeler, identified the fissioning isotope found by Otto Hahn and Lise Meitner as U-235. This Bohr-Wheeler theory is still considered to be the basis of our understanding of the fission process.

Today, this shy and humble man who shuns both publicity and the praise of all, still pleads with the world to drive the atom it has harnessed along the path of peace.

His argument for the peaceful use of the atom is not a new idea. Neither is it a plea spoken from fear of fallout or the awesome potential of H-bomb devastation.

Cooperation for Survival

There is no better way of showing this than to quote Dr. Bohr, who made the following remarks shortly after the end of hostilities in World War II when he was home once more in Copenhagen. The time was October, 1945, when he warned:

"We have left that time far behind us when each man could pick up the nearest stone for self-defense. We have also reached that place where the security offered the citizens of a nation by collective defense arrangements is altogether inadequate. Perhaps there is no defense possible against the new powers of destruction, and it depends upon a world-wide cooperation to prevent use of the new sources of energy for purposes which do not serve humanity as a whole. However, the possibility for an international control with this purpose in view may be said to be secured by the gigantic, special character of the efforts, which



FAMOUS DANE—On Tuesday, Oct. 24, Dr. Niels Bohr of Denmark will receive the world's first Atoms for Peace Award in Washington, D. C. The \$75,000 Award is being given to Dr. Bohr for his contributions to the peaceful uses of the atom.

are unavoidable in manufacturing the new terrible weapon."

"Every man of science who has helped in the work to lay the foundations of the new development is ready to help in every way he sees clear to find a solution of humanity's present crisis, which will be worthy of the ideals for which science has struggled through the ages."

The Atoms for Peace Award grew out of an appeal from President Eisenhower made on July 20, 1955, at Geneva, Switzerland. It was created as a memorial to Henry and Edsel Ford. One million dollars, provided by the Ford Motor Company Fund, was authorized to be used at a rate of \$100,000 a year for ten years. This, the first year, brought 75 candidates proposed by scientific bodies in 23 countries.

Science News Letter, October 19, 1957

TECHNOLOGY

Ultraviolet Lamp Kills Flu Bug at Home

► AN ULTRAVIOLET lamp that can be inserted in a heating or air conditioning duct and kills 80% of airborne virus and bacteria in the home has been designed and manufactured.

The lamp is particularly good for killing the flu virus and has been designed for use in homes, schools and offices, Edward G. F. Arnott, director of research for the Westinghouse lamp division, Bloomfield, N. J., has reported.

Similar type ultraviolet lamps are being used by manufacturers of polio and Asian flu vaccines to kill the active virus before making it into a vaccine.

The new type of Sterilamp produces radiation that is up to 1,000 times more effective in killing microorganisms than an equal amount of ultraviolet radiation from the sun.

Similar lamps have been used for many years in operating rooms to prevent infections during operations.

The Sterilamp tube can be installed in most homes in a few minutes and will be optional equipment with some furnaces and air conditioners next year.

Science News Letter, October 19, 1957

PUBLIC HEALTH

Too Much Tranquilizer Can Cause Convulsions

► LARGE DOSES of chlorpromazine, the widely used tranquilizing drug, can produce convulsions in monkeys and may do the same thing to humans.

This latest finding is reported by scientists at the U. S. Public Health Service hospital, Lexington, Ky., who warn the drug may be hazardous in the treatment of either alcoholism or epilepsy.

A number of reports have appeared suggesting the tranquilizer may have convulsant effects so it was given in large doses to four "normal" monkeys, they report.

All the monkeys developed epileptic-like seizures and three of them apparently began seeing things that did not exist.

One kept searching the floor of his cave

as if he were looking for an imaginary object, and occasionally leaped backward as if afraid of something.

The amount of the drug given was admittedly large, but the same dosage had been reported in use on humans in one clinic, the scientists say.

On lower doses, no convulsions were seen, indicating that the greater the dose of chlorpromazine, the greater is the likelihood of seizures.

The current widespread use of the tranquilizer "warrants speculation" about its use in either epilepsy or the management of addict withdrawals from alcohol and barbiturates, the scientists conclude.

The study was made by Drs. Carl F. Essig and Woodrow W. Carter of the hospital's NIMH Addiction Research Center and is reported in the *Proceedings of the Society for Experimental Biology and Medicine* (Aug.-Sept.).

Science News Letter, October 19, 1957

ICHTHYOLOGY

Polluted Rivers May Be Too Hot for Fish

► EARLIER estimates of how hot the water in a river has to be before its fish population disappears might have to be revised, a British scientist reports.

The present limits for the temperature of polluted rivers may be too high, says A. W. Cocking, Portsmouth.

In an experiment described in *Nature* (Sept. 28), he finds that roach, a fresh water fish of the carp family, "lose condition" while some individuals die, after prolonged exposure to temperatures as much as seven degrees below the supposed maximum lethal temperature (now put at about 92 degrees Fahrenheit).

The scientist points out that there is also little relation between the temperature range necessary for good growth and reproduction and a temperature hot enough to kill. A species will eventually disappear from a waterway if the temperature is too high for it to reproduce, even though adult fish are not killed.

Science News Letter, October 19, 1957



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BEHAVIOUR OF METALS AT ELEVATED TEMPERATURES: Lectures Delivered at the Institution of Metallurgists Refresher Course, 1956—N. P. Allen and others—*Philosophical Library*, 122 p., illus., \$6.00. Of interest to metallurgists and engineers designing equipment for high temperature operation.

BOTANY LABORATORY MANUAL—Erich Steiner, Alfred S. Sussman and Warren H. Wagner, Jr.—*Dryden Press*, 260 p., illus., paper, \$3.40. A manual for elementary botany. A teacher's guide is available.

THE CARBOHYDRATES: Chemistry, Biochemistry, Physiology — Ward Pigman, Ed. — *Academic*, 902 p., \$20.00. A reference work for chemists and others and a text for graduate courses.

CHEMISTRY OF NATURAL AND SYNTHETIC RUBBERS—Harry L. Fisher—*Reinhold*, 208 p., illus., \$6.50. It is only in recent years that chemists have known much about these substances.

COMPARATIVE PHYSIOLOGY OF THE NERVOUS CONTROL OF MUSCULAR CONTRACTION—Graham Hoyle—*Cambridge University Press*, Cambridge Monographs in Experimental Biology 8, 147 p., diagrams, \$3.00. Muscle cells are found even in the sponges, but sponges have no nerve cells, so excitation of these muscle cells must result entirely from local stresses.

THE ECOLOGY OF MAN — Paul B. Sears — *Oregon State System of Higher Education*, 61 p., illus., paper, \$1.00. Telling of the effect of

the environment on man and his influence on his surroundings.

EXPLORING BY SATELLITE: The Story of Project Vanguard—Franklyn M. Branley—*Crowell*, 42 p., illus. with drawings by Helmut K. Wimmer, \$3.00. A timely book.

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FISHES OF THE WORLD—Edouard Le Danois with the collaboration of Jacques Millot, Theodore Monod, and Paul Budker—*Countryman Press*, 190 p., illus., \$12.50. The photographs illustrating this book are breath-takingly beautiful.

GEOLOGY OF THE CLIFTON FORGE IRON DISTRICT, VIRGINIA—Frank G. Lesure—*Virginia Polytechnic Institute*, Engineering Experiment Station Series No. 118, 130 p., illus., maps, \$1.00. The iron deposits in this area produced about 10,000,000 tons of ore from 1832 to 1925.

HIGHWAY NEEDS STUDIES 1957—David M. Baldwin and others—*Highway Research Board*, Bulletin 158, 133 p., illus., paper, \$2.80. It has been found possible to predict accident rate on a particular stretch of road and also the rate of travel to aid in making budgets for roads.

ICE ISLAND: The Story of Antarctica — R. Frank, Jr.—*Crowell*, 218 p., illus., \$3.50. Telling what men have discovered about the southernmost part of the world.

ILLUSTRATED MEDICAL AND HEALTH ENCYCLOPEDIA—Morris Fishbein, Ed.—*Stutman*, 2166 p., 8 volumes, illus., \$19.50. Information useful in the home on alphabetically arranged topics from abdomen to zygoma and zyme.

MAN: His First Million Years—Ashley Montagu — *World Publishing Co.*, 249 p., illus., \$3.75. Telling, for "people who want to learn," of the evolution of modern man and the life of early man.

PAGOO—Holling Clancy Holling—*Houghton Mifflin*, 87 p., illus. with drawings by the author and Lucille Webster Holling, \$3.75. A book for young readers about a small hermit crab.

PRIMER FOR PARAPLEGICS AND QUADRIPLEGICS—*Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center*, Patient Publication No. 1, 38 p., illus., paper, 50 cents. A manual for those who have become paralyzed due to damage to the spinal cord, telling them how to be the most comfortable and how to get the most they can out of life.

RADIO ASTRONOMY—H. C. van de Hulst, Ed. — *Cambridge University Press*, International Astronomical Union Symposium No. 4, 409 p., illus., \$9.50. Containing all but two of the papers presented at the meeting.

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UNDERSTANDING ELECTRONICS: From Vacuum Tube to Thinking Machine—John Lewellen—*Crowell*, 213 p., illus. with drawings by Ida Scheib, \$2.75. Explaining many of the gadgets that make up our modern world.

WHEEL OF TIME—Harry Zarchy—*Crowell*, 133 p., illus. with drawings by René Martin, \$2.75. Telling what time is and how it is measured.

WILLIAM HARVEY TRICENTENARY COMMEMORATION 1957: Catalog of Exhibit—*Govt. Printing Office*, Public Health Service, 30 p., illus., paper, 15 cents.

YOUR WONDERFUL WORLD OF SCIENCE—Mae and Ira Freeman—*Random House*, 84 p., illus. with drawings by René Martin, \$1.95. Telling children about the interesting world we live in and some experiments they can do to learn more about it.

Science News Letter, October 19, 1957

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BIOLOGY

Experiments Successfully Predict Animal's Sex

► EXPERIMENTS have been successfully completed which indicate that scientists may soon be able to control the sex of animals.

Dr. Manuel Gordon, who performed the research while working at the University of California, reports that he was able to predict correctly the sex of almost 70% of 167 rabbits obtained from 31 litters in his experiments. Further developments and "refinements" in the technique used could mean important advances in the breeding of domestic animals.

Using a method of sex control based upon electrical properties of the sperm cells, Dr. Gordon was able to separate "male" or Y chromosome carrying sperm cells from "female" or X chromosome carrying sperm cells. An electrophoresis apparatus, a chamber containing positively and negatively charged poles with an electrical potential between them, was used. When a solution containing the sperm is placed in the chamber, the female-producing sperm migrates toward the anode and the male-producing sperm toward the cathode.

While the technique is believed to be original in its details, it is based on the general principle originated by the Russian scientists. Many details of the work of the Russian scientist Vera Schrodler, who reported the control of sex in rabbit offspring in the 1930's, are lacking.

A report of Dr. Gordon's research will appear in *Proceedings of the National Academy of Sciences* (Oct.).

Science News Letter, October 19, 1957

MEDICINE

Find Better Drug for Stopping Blood Clots

► A SUBSTANCE that may help heart patients by preventing their blood from clotting has been isolated by Dr. Eugene J. Towbin, Veterans Administration Hospital, Little Rock, Ark., the VA has announced.

The anticoagulant has not yet been fully identified, but in animal experiments it shows promise of being better than the presently used ones. Anticoagulants now administered to patients can cause bad reactions unless doses are carefully controlled.

The new substance, believed to be a protein, is found in most animals and human tissue. It prevents blood clotting by stopping the formation of the substances that go into the clot.

The unidentified clot preventer acts on the clot-forming process at an earlier stage than do other anticoagulants, Dr. Towbin said.

Anticoagulant drugs are widely used to prevent death-dealing clots in the kind of heart attack known as coronary occlusion and in conditions where blood clots form in the veins.

Scientists at the hospital have been attempting to extract the drug in chemically pure form for the past six months.

Science News Letter, October 12, 1957

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Questions

CHEMISTRY—What gas is used to activate a new kind of dry battery capable of operating at low temperatures? p. 248.

□ □ □

GEOPHYSICS—What are the advantages of the Polar orbit followed by the Russian satellite? p. 244.

□ □ □

What is the magnetic equator? p. 246.

□ □ □

METALLURGY—How high a temperature can niobium alloys withstand? p. 247.

□ □ □

PUBLIC HEALTH—What effects did large doses of chlorpromazine have on normal monkeys? p. 251.

□ □ □

Photographs: Cover and p. 243, National Advisory Committee for Aeronautics; p. 245, U. S. Naval Research Laboratory; p. 247, Westinghouse Electric Corp.; p. 250, John J. Laughlin; p. 256, Flick-Reedy Corp.

ASTRONOMY

Order Second Printing Of Astronomical Atlas

➤ A SECOND PRINTING for the unique Sky Survey's monumental atlas of the heavens has been ordered following the astronomical sale of the 100 copies from the first printing. (See SNL, June 19, 1954, p. 388.)

Ten orders are now on hand for the 1,758 outstandingly beautiful photographs. Each copy of the atlas fills nine filing cabinets and costs more than \$2,000 to print. The 14-inch-square photographs, covering all the sky visible from Mt. Palomar, Calif., were taken with the 48-inch Schmidt telescope.

The Atlas is the result of the National Geographic Society-Palomar Observatory Sky Survey. Mount Wilson and Palomar Observatories are jointly operated by the Carnegie Institution of Washington and the California Institute of Technology. Orders for the second printing will be accepted through April, 1958.

Copies from the original printing were shipped in sections to observatories, universities and astronomical organizations around the world, including behind the Iron Curtain. A few individuals placed orders for the volume, which sells at about cost.

Science News Letter, October 19, 1957

Do You Know?

By studying the folds and hummocks of Antarctic ice, scientists hope to get clues to the way the Alps, Himalayas, Rockies and other mountain ranges were formed.

Heart disease has been the leading cause of death in the U. S. since before World War I, except during the 1918 influenza pandemic.

Meteor showers probably result from the passage of the earth through the same part of space traversed, in times past, by a comet.

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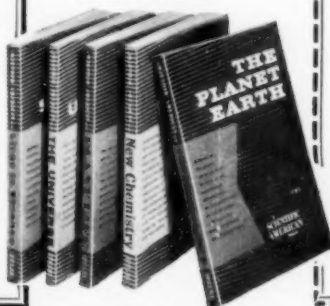
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🌀 **STUD WELDING GUN** can weld studs up through one-half inch in diameter. Claimed to be one-third lighter than other such welders, the gun weighs less than four pounds and is nine inches long. The small welder has a handle and barrel of plastic.

Science News Letter, October 19, 1957

🌀 **TELEPHONE PENCIL** clips onto the edge of the telephone so that it is always handy. The mechanical pencil is fastened on an 18½-inch long chain and is designed to frustrate children who might want to wander with the pencil. Easily installed or removed, the clip can be placed on the left or right side.

Science News Letter, October 19, 1957

🌀 **VISUAL AID** for those who work with a steel rule or gauge is a magnifying glass that clings to the rule. Housed in butyrate plastic, the glass is flanked by magnets in rectangular receptacles. The hold-fast magnifier makes easier reading of figures and markings.

Science News Letter, October 19, 1957

🌀 **DEPOSITOR'S LIFT** for bank sits before a teller's window and raises customers up to the teller's sill. The hydraulic lift, designed for the convenience of young depositors, has a 20-inch platform equipped with a telescoping stainless steel skirt and



is raised or lowered by the cylinder. The platform, shown in the photograph, comes up to 12 inches above the bank floor.

Science News Letter, October 19, 1957

🌀 **PORTABLE DISHWASHER-DRYER** is said to be designed for easy conversion to free-standing or permanent under-the-counter use. An adapter kit enables the apartment dweller to snap the two five-foot

water connection and discharge hoses onto any conventional faucet. The machine is 24 inches wide, 25½ inches deep and 36¾ inches tall.

Science News Letter, October 19, 1957

🌀 **TABLE SET** modeled in the shape of a flower pot with flowers holds sugar, salt and pepper. The white pot holds the sugar, the red rose serves as a pepper shaker and the yellow rose as a salt shaker. The plastic set stands seven and one-half inches high.

Science News Letter, October 19, 1957

🌀 **LAMINATING KIT** for permanently sealing clippings or pictures between clear plastic requires no water connections or installation. The kit includes a four-by-five-inch electric sealing press with a 300 watt 115 volt heater, two polish plates and 50 sheets of plastic. Refills of plates and sheets are available.

Science News Letter, October 19, 1957

🌀 **DRIVEWAY REFLECTOR** "lights up" from all directions. Designed for parking lots, home driveways, boat docks and other applications, the reflector is made of a hollow three-inch "beehive" molded from transparent acrylic plastic. Screwed on to the end of an 18-inch rod, a row of these miniature lighthouses can mark a drive around a 90-degree curve.

Science News Letter, October 19, 1957



Nature Ramblings



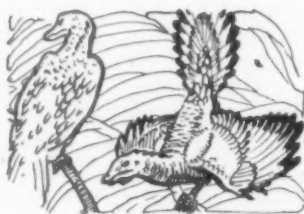
By HORACE LOFTIN

➤ SOME SIX or more million years ago, a new kind of experiment in living was begun. The new experiment was the evolution of feathers, arising in reptile-like animals from what before had been scales.

Other creatures had tried flight before, notably the insects. Among the larger creatures, the great winged lizards, the pterodactyls, had met a fair amount of success in taking to the air. But their wings of membranous skin were not enough for sustained flight.

Fossils dating about six million years of age represent the first true birds, odd creatures that seem to be a mixture of reptile and fowl. We call these fossil animals "Archeopteryx," meaning "ancient winged creatures." They were about the size of modern crows, but beyond this and the shape of their feet and legs the resemblance quickly ends.

The Ancient Winged Creature



Notice from the picture that the Archeopteryx had a long tail. This reptile-like tail contained 20 slender bones, placed end to end, with a pair of feathers for each bone. Modern birds have a stub of a tail, with all the tail feathers emerging more or less together.

Another primitive, reptilian characteristic of the Archeopteryx was the presence of three-fingered claws at the front of each wing.

Modern birds typically have three "fingers" that are generally concealed by feathers. An exception is the Hoatzin of South America, a primitive bird in many respects, which has long wing claws with which it climbs about in trees.

Another reptilian mark of the Archeopteryx is that it bore a fine set of teeth in skin-covered jaws. In structure and position in the jaws, Archeopteryx's teeth were quite similar to those of the crocodile.

It has been said—however unlikely it may seem at first glance—that of all the modern reptiles, the crocodiles probably are closest kin to the birds. Of course, this does not mean birds descended from crocodiles, but that they may share a common ancestor.

In spite of all its reptilian marks, the Archeopteryx was a true bird, for it bore the one unmistakable characteristic that all birds have and no other creature can claim—feathers.

Science News Letter, October 19, 1957